

**REMARKS**

Claims 1, 3-7, 9-12, and 14-20 and 23-28 are pending in this application. By this Amendment, the specification is amended to remedy minor informalities, claims 1 and 12 are amended, and claims 23-28 are added. No new matter is added.

Applicants appreciate the courtesies shown to Applicants' representatives by Examiner Wallerson in the June 22 personal interview. Applicants' separate record of the substance of the interview is incorporated into the following remarks.

In the Office Action, claims 1 and 12 are rejected under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed.

The Office Action states that there is no support for the perceivable "only by a human observer" feature in claims 1 and 12. Claims 1 and 12 are amended for clarity. In particular, the claims now recite that the image quality analysis provides image quality results that correlate with image quality deviations perceivable by a human observer so that image quality deviations perceivable by a human observer are identified. This is supported, for example, by the problem addressed at Applicants' page 1, lines 10-21 and the exemplary solution disclosed at page 8, lines 1-8. See also Applicants' page 1, lines 26-30 and page 2, lines 12-16 and 23-24. This solution is achieved, for example, by a suitable band-pass filter (page 8, line 9) or a more complex modeling, such as a transfer function based on a particular scanner device and a visual transfer function that takes into account the sensitivity of the human visual system (HVS) (page 8, lines 18-28) prior to the image quality analysis.

Thus, the Applicants' claimed invention filters the test image with human visual system (HVS) models so that the test targets have a resolution similar to that perceived by a human so that the image quality analysis identifies differences in image quality that correlate with those perceived by a human observer. This is required in solving the problem addressed

on page 8, lines 2-8 where it states that "rather than having the analysis merely compare a scanned image to an original to determine some level of variation or deviation from a given norm that may or may not rise to the level of a perceived image quality issue when viewed by a human observer, the [claimed] image quality analysis utilizes human visual perception models" (to provide a result that identifies those image quality issues perceivable by a human observer).

Accordingly, Applicants believe that independent claims 1 and 12 and claims dependent therefrom are fully supported and enabled by the specification. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 1, 3-7, 9, 11, 12, 18 and 19 are rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,275,600 to Banker. This rejection is respectfully traversed.

The invention recited in independent claims 1 and 12 recites, *inter alia*, an image quality analysis module that includes a human visual filter that filters the test targets so that the test targets are similar in resolution to that perceivable by a human visual system, and the image quality analysis module obtains results quantifying image quality that correlate with image quality deviations perceivable by a human observer, wherein the image quality analysis module identifies image quality deviations that are perceivable by the human observer.

The Office Action alleges that human visual system filtering is supported at col. 1, lines 56-63, col. 10, lines 38-39, col. 3, lines 15-20, and col. 6, lines 54-64. Applicants respectfully disagree.

Regarding the passage on col. 1 of Banker, this passage merely states that various measurements are taken. It does not teach or disclose human visual system filtering.

Regarding the passage on col. 10 of Banker, this passage in a claim is not clearly otherwise enabled by the accompanying disclosure so as to have any definite meaning that

would have enabled one of ordinary skill in the art to derive Applicants' claimed subject matter. The referred to "quality ratings" in Banker are detailed at col. 9, lines 4-28. The individual metric ratings are indicated to be normalized and weighted to achieve an overall quality rating. However, there is no teaching or disclosure of human visual system filtering so that the resolution is similar to that perceivable by a human visual system. Moreover, there is no teaching or disclosure of the image quality analysis module performing image quality analysis on the human visual system filtered test images.

To the contrary, the problem identified in Banker on col. 1, lines 39-37 would teach against this human visual filtering, such as with a particular bandpass filter, by suggesting that humans have difficulty in distinguishing color changes and other quality issues such as streaking. Moreover, Banker teaches that its automated system has improved print quality judgments over such manual assessments. Thus, Banker teaches an automated system with higher visual distinction than a human would have. This is further supported by Banker on col. 2, lines 52-62 where it teaches a preference to use a scanner with at least twice the spatial resolution of the printer to capture details of the printed image to provide a "high resolution digital representation."

Thus, Banker clearly supports a contrary position that would, if anything, teach away from the claimed invention by suggesting to one of ordinary skill in the art the desirability to increase image quality sensitivity, rather than reduce it through human vision model filtering to be limited to image quality problems that correlate with a human visual system so that the results correlate with those perceivable by a human observer.

Regarding the passage on col. 3, it has previously been pointed out that the upper portion 15 of image 16 does not form part of the automated image quality analysis, but rather is used for manual visual inspection. This is evidenced by the absence of specific detail,

which would otherwise be required for enablement if it were part of the automated system.

Moreover, when read in context, it is evident that a manual inspection of section 15 was the intent by Banker's recitation that top section 15 is "intended for visual quality ranking" (col. 3, line 19) and the subsequent passage (col. 3, lines 20-22) where it states that the lower section "contains target objects 16a-f that are analyzed without human intervention." This clearly implies that the upper section does rely on human intervention (i.e., manual visual inspection). This is further confirmed by the specific details in Banker which, once the landmarks have been established, teaches only analysis of the test objects (16a-f), which are in lower section 16, by the automated system. That is, Banker's enabling disclosure performs no analysis of the top section 15 other than to isolate land marks. This further shows that what is alleged to be human quality ranking is not performed by the automated process of the image quality analysis system in Banker, but rather could only be performed manually. Thus, this passage, if anything, teaches away from the invention.

Regarding the passage on col. 6, this passage has no discernable human visual system filtering. Instead, it teaches that a Gaussian function 64 modeling a typical streak pattern is compared against the test object and that the results are ranked by correlation values. This passage merely mentions that the perceptible visibility is determined by the ranking as those with high correlation values. This does not teach or disclose performing human vision system filtering as claimed, but rather just states the obvious that only those detections that highly match a reference pattern may be relevant. Again, this normalizing has nothing to do with filtering to a resolution similar to that of a human observer.

In Applicants' system, only those image quality deviations that are human perceived are in the results. Thus, any corrective action, such as adjustment or service call, based on the results is also based on the human perspective of image quality. This avoids unnecessary

adjustments or machine down time to correct or adjust for machine identifiable problems that would not have been perceived as problems by the human operator. Such a problem is not appreciated by Banker. Instead, to the contrary, Banker as a whole teaches away from the claimed invention.

Because Banker fails to teach or disclose each and every feature of independent claims 1 and 12, these claims and the claims dependent therefrom are not anticipated by Banker. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 10 and 14-17 are rejected under 35 U.S.C. §103(a) over Banker in view of U.S. Patent No. 5,365,310 to Jenkins. This rejection is respectfully traversed.

Banker is discussed above. Jenkins fails to overcome the deficiencies of Banker with respect to independent claims 1 and 12. Therefore, dependent claims 10 and 14-17 are deemed allowable for their dependence on allowable base claims 1 and 12 and for the additional features recited therein. Withdrawal of the rejection is respectfully requested.

New claims 23-28 are added. These claims are supported by, for example page 7, lines 23-31 and page 1, lines 26-30. These claims are deemed allowable for their dependence on allowable base claims and for the additional features recited therein. In particular, both claims 23 and 25 add a specific user threshold. Such a feature is not taught or suggested by Banker.


Regarding claims 27-28, these claims further specify that the image quality analysis module or method determines whether corrective action is needed for the image output device based on the correlated results (correlated to image quality deviations perceivable by a human observer) to so that corrective action takes into account human perceivable image quality traits. As discussed during the personal interview, although Banker mentions in passing a

few vague references to "human perception of quality," there is no enabling disclosure of how the image quality system would provide corrective action based on such. Rather, the only disclosure is on col. 9, lines 5-27 and references normalizing and weighting. However, these appear to just make a standardized rating system, and do not teach or suggest that correction is correlated with human perceived image quality.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the pending claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

  
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